Name _____

Unit 3.2 Exam – Part 2

AP Biology

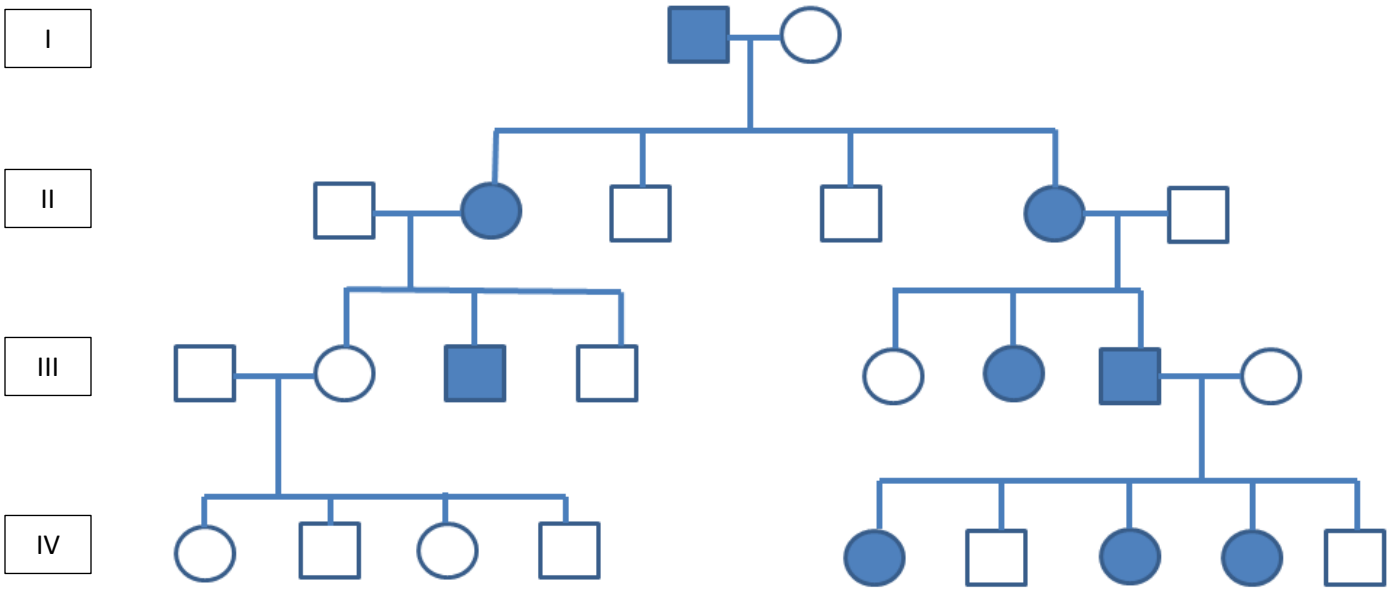
2017 - 2018

This exam will be returned to you so be sure to annotate it while testing so you can understand any misconceptions when it is returned to you for review.

There are 3 Free Response questions

The exam must be completed within the class period

1. The pedigree below models the inheritance of a disorder over 4 generations in a family. Squares represent males and circles represent females and shaded individuals have an affected phenotype. Numbering of individuals goes from left to right in each generation. For example the first shaded female in generation 4 would be identified as IV-5 and the second unshaded male in generation 2 would be identified as II-3.



a. **Predict** the pattern of inheritance modeled in the pedigree above.

b. **Construct** ONE Punnett square or cross from the pedigree that supports the inheritance pattern you identified in part a. Be sure to identify the individuals from the pedigree in your cross.

c. **Explain** how the results of the Punnett square or cross you constructed in part b support the inheritance pattern.

2.

A new species of fly was discovered on an island in the South Pacific. Several different crosses were performed, each using 100 females and 100 males. The phenotypes of the parents and the resulting offspring were recorded.

Cross I: True-breeding bronze-eyed males were crossed with true-breeding red-eyed females. All the F_1 offspring had bronze eyes. F_1 flies were crossed, and the data for the resulting F_2 flies are given in the table below.

F_2 Phenotype	Male	Female
Bronze eyes	3,720	3,800
Red eyes	1,260	1,320

Cross II: True-breeding normal-winged males were crossed with true-breeding stunted-winged females. All the F_1 offspring had stunted wings. F_1 flies were crossed, and the data for the resulting F_2 flies are given in the table below.

F_2 Phenotype	Male	Female
Normal wings	1,160	1,320
Stunted wings	3,600	3,820

Cross III: True-breeding bronze-eyed, stunted-winged males were crossed with true-breeding red-eyed, normal-winged females. All the F_1 offspring had bronze eyes and stunted wings. The F_1 flies were crossed with true-breeding red-eyed, normal-winged flies, and the results are shown in the table below.

Phenotype	Male	Female
Bronze eyes, stunted wings	2,360	2,220
Bronze eyes, normal wings	220	300
Red eyes, stunted wings	260	220
Red eyes, normal wings	2,240	2,180

a. What conclusions can be drawn from cross I and cross II? **Explain** how the data support your conclusions for each cross.

b. Write a null hypothesis that can be tested for the data from cross III.

c. Perform a chi square to test your null hypothesis.

d. Use the results from your chi square to accept or reject your null hypothesis.

3. The distances between various genes located on the same chromosome of flies are shown in the table below. Boxes without data are left blank since they would repeat data already present.

	Body Color	Wing Length	Eye Color	Wing Shape	Leg Length	Wing Angle
Body Color	0					
Wing Length	18.5	0				
Eye Color	56	37.5	0			
Wing Shape	35.5	54	91.5	0		
Leg Length	17.5	36	73.5	18	0	
Wing Angle	27	8.5	29	62.5	44.5	0

a. Construct a gene map for all six genes shown in the table above.
b. Besides these genes all being linked on the same chromosome, identify ONE reason that could account for any deviations from traditional inheritance patterns.